

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant :	Eitan Bachmat et al.	Art Unit :	2185
Serial No. :	10/083,670	Examiner :	Nguyen Ba, Hoang Vu A
Filed :	February 26, 2002	Conf. No. :	9453
Title :	DYNAMIC DEMONSTRATION OF UNIMPLEMENTED ALGORITHMS		

Mail Stop Appeal Brief - Patents

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

(1) Real Party in Interest

The real party in interest is the EMC Corporation, a Massachusetts corporation having a place of business at 176 South Street, Hopkinton, MA 01748-9103 as evidenced by an assignment executed on May 5, 2002(Eitan Bachmat); April 30, 2002 (Hagit Bachmat); and May 15, 2002 (Ron Arnan) and submitted for recordation at the U.S. Patent Office on June 6, 2002, and recorded at reel 012966 and frame 0141.

(2) Related Appeals and Interferences

Neither Appellant, nor Appellant's legal representative, nor the assignee are aware of any appeals or interferences that will directly affect or be affected by or have a bearing on the Boards decision in the pending appeal.

(3) Status of Claims

Appellant filed the present application on February 26, 2002 with claims 1-29. Of these, claims 1, 10, 14, 15, 16, 25, and 29 were independent.

No claims have been cancelled. Accordingly, claims 1-29 are pending. Claims 18-19 and 26 are allowable. Hence, claims 1-17, claims 20-25, and claims 27-29 are on appeal.

Because the rejections at issue are based on section 112, certain claims on appeal depend on allowed claims. For the Board's convenience, the Appendix shows all claims, including those allowed to facilitate consideration of any claims that are dependent on allowed claims.

(4) Status of Amendments

Claims 1-3, 5, 11-13, 14-18, 20-21, 26, and 29 were amended in response to the first office action. In response to the final Office Action, Appellant proposed an amendment to claim 29. This amendment has been entered.

(5) Summary of Claimed Subject Matter

Claim 1

<i>In a data-storage system [10], a method for providing data indicative of the performance of a competing algorithm [20] and an incumbent algorithm, said method comprising:</i>	
<i>evaluating an incumbent-algorithm score [26] indicative of a performance of an incumbent algorithm [20];</i>	Page 6, lines 13-25
<i>simulating performance of a competing algorithm executing in place of said incumbent algorithm;</i>	Page 7, lines 4-6
<i>on the basis of said simulation, evaluating a competing-algorithm score [34 a-b] predictive of a corresponding performance of said competing algorithm; and</i>	Page 7, lines 7-11
<i>providing said competing-algorithm score and said incumbent-algorithm score to an output device [40].</i>	Page 7, lines 12-14

Claim 10

<i>A method for providing data [38] indicative of a performance of a competing algorithm [20] and an incumbent algorithm in a data-storage system [10], said method comprising:</i>	
<i>statistically characterizing a usage pattern of said data-storage system; and</i>	Page 6, line 26 – page 7, line 3; page 3, lines 3-6. Usage pattern is output of condenser (see page 6, lines 27 to page 7, line3
<i>on the basis of said statistical characterization, simulating a performance of said competing algorithm were it to execute on said data-storage system in place of said incumbent algorithm.</i>	Page 7, lines 4-6; page 3, lines 6-8

Claim 14

<i>A method for comparing performances of a plurality of algorithms in performing a task, said method comprising:</i>	
<i>simulating execution of a competing algorithm operating on an input stream [22];</i>	Page 7, lines 4-6
<i>evaluating, on the basis of said simulation, a competing-algorithm performance [34a-c] of said competing algorithm;</i>	Page 7, lines 6-11
<i>evaluating an incumbent-algorithm [20] performance of an incumbent-algorithm operating on said input stream; and</i>	Page 6, lines 12-25
<i>providing data [38] indicative of a comparison between said incumbent-algorithm performance and said competing-algorithm performance.</i>	Page 7, lines 12-18

Claim 15

<i>A data-storage system comprising</i>	
<i>a processor,</i>	
<i>and computer-readable media having software encoded thereon, said software having instructions for causing the processor to execute</i>	
<i>a data-condenser [28] configured to receive a data-stream, said data-condenser generating meta-data characterizing said data stream;</i>	Page 6, lines 26- page 7, line 3
<i>a competing-algorithm simulator [30a-c] in communication with said data-condenser, said competing algorithm simulator generating data indicative of a performance attribute of a competing algorithm when said competing algorithm operates on a data-stream characterized by said meta-data; and</i>	Page 6, lines 27-28; page 7, lines 4-11
<i>a tournament manager [36] configured to provide output data [38] indicative of a comparison between a performance attribute of said competing algorithm and a corresponding performance attribute of an incumbent algorithm.</i>	Page 7, lines 12-25

Claim 16

<i>A computer-readable medium having encoded</i>	See claim 1
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<i>thereon software for providing data indicative of the performance of a competing algorithm and an incumbent algorithm, said software comprising instructions for:</i>	
<i>evaluating an incumbent-algorithm score indicative of a performance of an incumbent algorithm;</i>	
<i>simulating performance of a competing algorithm executing in place of said incumbent algorithm; on the basis of said simulation, evaluating a competing-algorithm score predictive of a corresponding performance of said competing algorithm; and</i>	
<i>providing said competing-algorithm score and said incumbent-algorithm score to an output device.</i>	

Claim 25

<i>A computer-readable medium having encoded thereon software for providing data indicative of a performance of a competing algorithm and an incumbent algorithm in a data-storage system, said software comprising instructions for:</i>	See claim 10
<i>statistically characterizing a usage pattern of said data-storage system; and</i>	
<i>on the basis of said statistical characterization, simulating a performance of said competing algorithm were it to execute on said data-storage system in place of said incumbent algorithm.</i>	

Claim 29

<i>A computer-readable medium having encoded thereon software for comparing performances of a plurality of algorithms in performing a task, said software comprising instructions for:</i>	See claim 14
<i>simulating execution of a competing algorithm operating on an input stream;</i>	
<i>evaluating, on the basis of said simulation, a competing-algorithm performance of said competing algorithm;</i>	
<i>evaluating an incumbent-algorithm performance of</i>	

<i>an incumbent-algorithm operating on said input stream;</i>	
<i>providing data indicative of a comparison between said incumbent algorithm and said competing algorithm.</i>	

(6) Grounds of Rejection

1. Claims 1, 6-10, 14-17, 20-25, 27-29 stand rejected under 35 USC 112 for failing to meet the enablement requirement.
2. Claims 1, 6-10, 14-17, 20-25, 27-29 stand rejected under 35 USC 112 for failing to meet the written description requirement.
3. Claims 1-12 stand rejected under 35 USC 101 as failing to recite statutory subject matter.

(7) Argument

SECTION 112 ENABLEMENT REJECTIONS

As a threshold matter, the Examiner has not met the burden of proof as articulated by the Federal Circuit:

"When rejecting a claim under the enablement requirement of section 112, the PTO bears an initial burden of setting forth a reasonable explanation as to why it believes that the scope of protection provided by that claim is not adequately enabled."¹

In rejecting the claims as lacking enablement, the Examiner states that

"if one skilled in the art decides to reproduce the claimed invention, he/she would not know how to, based on a vague, generic, and non-enabling disclosure."²

But this is merely a conclusory assertion, unsupported by evidence. At best, it amounts to the proposition that the evidence (if there were any) is intended to prove. In effect, the Examiner is stating little more than that the claims are not enabled because they are not enabled. Such circular reasoning hardly rises to the level of "a reasonable explanation" for *why* a claim is not enabled.

¹ *In re Wright*, 999 F.2d 1557 (Fed. Cir. 1993).

² *Final Office Action*, page 12.

Moreover, the Examiner's statement suggests that in assessing whether claims are enabled, one may look only within the four corners of the specification. This is inconsistent with the law.

It is well established that enablement depends not just on the specification, but on the universe of knowledge available to one of ordinary skill in the art at the time the invention was made. As set forth by the Federal Circuit:

"[t]he purpose of [the enablement] requirement is to assure that the inventor provides sufficient information about the claimed invention that a person of skill in the field of the invention can make and use it without undue experimentation relying on the patent specification *and* the knowledge in the art."³ *[emphasis supplied]*

Consistent with this, Federal Circuit has pointed out that

"[a] specification need not disclose what is well known in the art."⁴

Three years later, the Federal circuit, further stated that it was in fact preferable to *avoid* restating what was well-known in the art:

"[A] patent need not teach, and *preferably omits*, what is well known in the art."⁵

The Examiner has declined to offer any reason why the content of the disclosure, combined with the knowledge available to one of ordinary skill in the art at the time of the invention, is insufficient to enable the claims. All that the Examiner has done is to repeatedly make conclusory assertions, unsupported by evidence, that the claims are not enabled.

For software-related inventions, the Federal Circuit has provided some guidelines for enablement:

"[A]s a general rule, where software constitutes part of a best mode of carrying out an invention, description of such a best mode is satisfied by a disclosure of the functions of the software."⁶

³ *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565 (Fed. Cir. 1991).

⁴ *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452 (Fed. Cir. 1984).

⁵ *Hybritech Inc. v. Monoclonal Antibodies, Inc.* 802 F.2d 1367 (Fed. Cir. 1986), cert. denied 480 U.S. 947 (1987) *[emphasis supplied]*.

⁶ *Fonar Corp. v. General Electric*, 107 F.3d 1543 (Fed. Cir. 1997).

FIG. 2 of the specification shows the constituent elements of software for carrying out the claimed method. The accompanying discussion, beginning on page 5, describes the function of each element. Therefore, based on *Fonar*, the claims are enabled.

Section 112 enablement rejection of claim 1

In the first office action, the Examiner indicated that in claim 1

- step 3 of claim 1 (“evaluating a competing algorithm score predictive of a performance of said competing algorithm”) *was* enabled, but
- step 1 of claim 1 (“evaluating an incumbent algorithm score indicative of a performance of an incumbent algorithm”) *was not* enabled.

Since step 3 is enabled, it follows that one of ordinary skill in the art would have understood, everything in it, including the “score predictive of a performance.”

According to the Examiner, step 1 is not enabled because one of ordinary skill in the art would not know what a “score indicative of performance” might be.⁷ The Examiner states this after having already conceded, in connection with step 3, that one of ordinary skill in the art would understand “score *predictive* of a performance.”

The Examiner does not offer any reason why one of ordinary skill in the art, who already knew what “a score *predictive* of a performance” was in step 3, would find himself puzzled by the mere replacement of “predictive” by “indicative,” i.e. “a score *indicative* of a performance,” in step 3.

Accordingly, Appellant submits that the Examiner has not met the burden of establishing an enablement rejection of claim 1.

Section 112 enablement rejection of remaining claims

The Examiner rejects claims 6, 7, 8, 9, 10, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 27, 28 and 29 under 35 USC 112 as not being enabled. For each claim, the Examiner follows the same two steps: (1) the Examiner identifies a particular limitation from claim; and (2) the Examiner states that one skilled in the art would not know enough about that that limitation “to write program

⁷ First Office Action, page 10.

instructions for a computer to make and/or use the entire scope of the claimed invention without undue experimentation.” For each claim, the Examiner’s second step is merely a statement of the ultimate conclusion. There is no recitation of facts or evidence that leads to that conclusion. Therefore, the Examiner has not met the burden set forth in *In re Wright* for making an enablement rejection.”⁸

In addition, the substance of the Examiner’s remarks on pages 9-10 of the first office action, made in connection with the enablement rejection, is essentially the same as that set forth on pages 7-8 in connection with the alleged failure to meet the written description requirement. Based on this, it appears that the Examiner has mistakenly conflated the enablement requirement with the written description requirement.

The written description requirement and the enablement requirement are not the same. The Federal Circuit has stated that “[a]lthough there is significant overlap, they are nonetheless independent of each other.”⁹ For example, according to the Court, “an invention may be described without an enabling disclosure” and “an invention may be enabled even though it has not been described.”¹⁰

The Examiner’s summary enablement rejection, which essentially repeats the written description rejection, suggests that the Examiner has not considered the distinction between the enablement and written description requirement. In effect, the Examiner presents reasons for why the Appellant was not in possession of the claimed invention, and uses those same reasons to advance a different proposition, namely that one of ordinary skill in the art would not be able to make the claimed invention without undue experimentation by using what was in the disclosure and what was known to those of ordinary skill in the art at the time of the invention. Nowhere has the Examiner suggested why, as a matter of law, a reason to advance the first proposition automatically advances the second.

⁸ *First Office Action*, page 10.

⁹ *University of Rochester v. G.D. Searle & Co., Inc.*, 358 F.3d 916 (Fed. Cir. 2004), quoting from *In re Alton*, 76 F.3d 1168, 1172 (Fed. Cir. 1996).

¹⁰ *Id.*

Accordingly, Appellant requests that the Board reverse the section 112 rejection of claims 6, 7, 8, 9,10,14,15, 16,17, 20, 21, 22, 23, 24, 25, 27, 28 and 29.

SECTION 112 WRITTEN DESCRIPTION REJECTIONS

One prerequisite for the validity of a claim is that the specification include a written description of the claimed subject matter.¹¹ Despite the term "written description," this prerequisite can be satisfied by the drawings as well as by the text.¹²

The written description requirement ensures that as of the time the application was filed, the inventor had in fact the invention as claimed.¹³ The written description requirement is often implicated when one attempts to prosecute claims that were not present in the application from which priority is claimed, as that application was originally filed.¹⁴

It is not necessary that the written description of the invention use the identical words used in the claim.¹⁵ However, the written description must be such that one can reasonably determine that the Appellant had possession of the invention.¹⁶ In some cases, the claim may be inherent in the original disclosure. However, for this to be the case, "the missing descriptive

¹¹ 35 USC 112 ("The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same")

¹² *Vas-Cath v. Marhurkar*, 935 F.2 1555 (CAFC 1991) ("[U]nder proper circumstances, drawings alone may provide a 'written description' of than invention").

¹³ *In re Barker*, 559 F.2d 588,592 (CCPA 1977) ("[T]he 'essential goal' of the description of the invention requirement is to clearly convey the information that an application has invented the subject matter which is claimed").

¹⁴ *Vas-Cath v. Marhurkar*, 935 F.2 1555 (CAFC 1991) ("The 'written description' requirement most often comes into play where claims not presented in the application when filed are presented thereafter. Alternatively, patent Appellants often seek the benefit of the filing date of an earlier filed application under 35 USC 119 or 35 USC 120 respectively for claims of a later-filed application"); *TurboCare Division of Demag Delaval Turbomachinery Corp. v. General Electric Co.*, 264 F.3d 111 (CAFC 2001) ("The written description requirement and its corollary, the new matter prohibition of 35 USC 132, both serve to ensure that the patent Appellant was in full possession of the claimed subject matter on the application filing date").

¹⁵ *In re Wilder*, 736 F.2d 1516, (CAFC 1984) ("It is not necessary that the claimed subject matter be described identically, but the disclosure originally filed must convey to those skilled in the art that Appellant had invented the subject matter later claimed"); *Fujikawa v. Wattanasin* 93 F.3d 1559 (CAFC 1996) ("[I]psius verbis disclosure is not necessary to satisfy the written description requirement").

¹⁶ *Fujikawa v. Wattanasin* 93 F.3d 1559 (CAFC 1996) ("Instead, the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question.").

matter must necessarily be present in the application's specification such that one skilled in the art would recognize such a disclosure."¹⁷

Section 112 rejection of claims 1 and 16 (written description)

The Examiner initially rejected claim 1 because it was not clear how one of ordinary skill in the art would know what claim 1's recitation of a "score indicative of performance" might be.

In response, Appellant directed the Examiner's attention to a portion of the specification that indicated that the "score indicative of performance" was a number. The Examiner now appears satisfied that one of ordinary skill in the art would recognize "score indicative of performance" as being a number.¹⁸

Nevertheless, the Examiner continues to regard claim 1 as failing to meet the written description requirement, but this time because

"[o]ne of ordinary skill in the art would still not know to which extent the competing-algorithm score exceeds the incumbent algorithm (e.g. what is the threshold number?)"

Section 112 requires that there be "a written description of the *invention*." But the invention as claimed does not recite any "threshold number." Therefore, whether or not the specification discloses a "threshold number" is utterly irrelevant.

Similarly, claim 1 does not recite any particular extent to which one score exceeds another. Indeed, the whole point of the claimed method is to determine what the two scores are. If one already knew the extent to which one score exceeded the other, there would be no point in carrying out the simulation in the first place.

In addition, an originally filed claim satisfies the written description requirement:

"Under these circumstances, we consider the original claim in itself adequate "written description of the claimed invention." It was equally a written description whether located among the original claims or in the descriptive part of the specification."¹⁹

¹⁷ *Lockwood v. American Airlines*, 107 F.3d 1565 (CAFC 1997).

¹⁸ *Final Office Action*, page 3.

¹⁹ *In re Gardner*, 480 F.2d 879, 880 (CCPA 1973).

Appellant further points out that claim 1 was an originally filed claim. Therefore, the text of claim 1 itself is available for satisfying the written description requirement.

Section 112 rejection of claims 6 and 21 (written description)

Claim 6 recites “obtaining meta-data characterizing input-data stream.”

The Examiner states that there is no written description for “meta-data.” In particular, the Examiner asks:

“What is exactly meta-data that can include, but not limited to, statistics descriptive of the input data-stream during the selected interval (Specification, page 2, last 1)?”

The specification describes meta-data as follows:

“Meta-data refers to data that characterizes the input data-stream 22. For example, meta-data might refer to the number of requests for data stored within a particular range of locations. In effect, meta-data is data that is used to statistically characterize the input data-stream 22.”²⁰

Appellant submits that this passage demonstrates that Appellant knew what “meta-data” was and appreciated the invention recited in claim 6.

The Examiner also suggests one of ordinary skill in the art would not understand the meaning of “input data stream” in claim 6.

The input data-stream 22, and its interaction with the system, is described beginning on page 5, line 16. The input data stream is described as a live input stream whose statistical characteristics are prone to change with time. The input data stream is thus a “random process” in the same way that the Bernoulli process (i.e. the process of flipping a coin) is a random process. This use of the term “random process” is consistent with the terminology used in probability and statistics. Other random processes in this art include the Poisson process, the Markov process, the Gaussian process, and many others.

The input data stream is also described as a “non-stationary” process. The use of terms like “stationary” and “non-stationary” is also well-known in the fields of probability and statistics. For example, the Bernoulli process is an example of a “stationary” process because

²⁰ Specification, page 6, line 29-page 7, line 3.

although the outcome of each flip is unknown, the probability of a particular outcome remains constant (i.e., the coin itself does not change).

Section 112 rejection of claims 7 and 22 “maintaining statistics”

The Examiner states there is no written description for claim 7's limitation of “maintaining statistics descriptive of said input data-stream during a selected interval.” In particular, the Examiner states that there is no concrete example of such statistics.

In response, Appellant draws attention to the passage cited in connection with the discussion of claims 6 and 21.

Section 112 rejection of claims 8 and 23 “incorporating a penalty”

Claim 8 recites the additional limitation of “incorporating a penalty into said competing-algorithm score.”

The Examiner states that one of ordinary skill in the art who has read the specification would not recognize that the Appellant had possession of the claimed invention. The Examiner reaches this conclusion by pointing out that the broadest reasonable meaning of the word “penalty” has meanings other than that which Appellant draws attention to.

Essentially the Examiner's argument is as follows:

1. The specification does not define “penalty.”
2. Therefore, “penalty” is given its “plain meaning.”
3. The word “penalty” has more than one “plain meaning.”
4. Therefore, Appellant could not be in possession of an invention defined by a claim that uses the word “penalty.”

The cited cases, and analysis based on those cases, refer to using the “plain meaning” of a term to determine whether a claim reads on the prior art, and not whether the written description requirement has been met.

The objective standard for determining compliance with the written description requirement is “does the description clearly allow persons of ordinary skill in the art to recognize he or she invented what is claimed.”²¹

Appellant suggests that one of ordinary skill in the art who read the passage

“In one practice of the invention, the tournament manager 36 can handicap the competing-algorithm scores 32a-c by amounts that reflect the system resources consumed in replacing the incumbent algorithm with the competing algorithm.”²²

would immediately understand that the term “penalty” in the claim refers to the amount by which the tournament manager handicaps the competing-algorithm scores.

There is no suggestion that the written description requirement imposes upon the Appellant a duty to provide support in the specification for each and every possible meaning of a claim term. Indeed, if the specification *were* to include support for each possible meaning of a claim term, one of ordinary skill in the art might just become confused as to which of those meanings was intended in the claim.

The Examiner further points out that there is no description of resources consumed. But neither is resource consumption recited in the claim. Claim 8 recites incorporating a penalty. There is no requirement in claim 8 concerning where the penalty comes from or how it is derived.

Claims 9, 24, 28: “selecting said penalty to be indicative of a cost...”

These claims recite the limitation of “selecting said penalty to be indicative of a cost associated with replacing said incumbent algorithm with said competing algorithm.”

In the passage quoted in connection with claims 8 and 23, the text

“by amounts that reflect the system resources consumed in replacing the incumbent algorithm with the competing algorithm”²³

clearly provides written description for this claim.

²¹ *In re Gosteli*, 872 F.2d 1008 (Fed. Cir. 1989).

²² *Specification*, page 7, lines 3-5.

²³ *Specification*, page 7, lines 24-25.

Claims 10, 15, 27: “generating meta-data characterizing an input data-stream”

Claim 10 does not recite the limitation of “generating meta-data characterizing an input data-stream.” Hence, this section 112 rejection cannot apply to claim 10.

Claims 15 and 27 recite the limitation of “generating meta-data characterizing an input data-stream.”

Written description for both “meta-data” and “input data-stream” has already been discussed above in connection with claims 6 and 21.

Claims 10, 25: “statistically characterizing a usage pattern...”

Claims 10 and 25 recite the limitation of “statistically characterizing a usage pattern of said data-storage system.”

The Examiner appears to agree that a “usage pattern” is a pattern of usage.²⁴ The Examiner has not, however, advanced any plausible reason why one of ordinary skill in the art who, having read the description, would fail to understand that the Appellant was in possession of the invention recited in claims 10 and 25.

The Examiner asks “Does this mean describing a usage pattern with a quantity that is computed from a sample?”

Appellant is unable to understand exactly what the Examiner wishes to know. It is unclear, for example, what “sample” the Examiner inquires about. There is no “sample” described in the specification.

The fundamental inquiry in assessing whether the written description requirement has been met is whether one of ordinary skill in the art would recognize that the inventor was in possession of the claimed invention at the time the application was filed. On its face, “usage pattern” is clearly understandable as being a pattern of usage. The Examiner has not offered any plausible basis for why one of ordinary skill in the art would fail to understand what this means.

²⁴ *Final Office Action*, page 8.

Claim 14 and 29

The Examiner has included claims 14 and 29 in the list of claims rejected as lacking support in the written description. However, the Examiner does not specify specifically what limitation of these claims is believed to lack support in the description.

In the Final Office Action, the Examiner stated that claims 14 and 29 recite limitations similar to claims 1 and 16.²⁵

However, in rejecting claims 1 and 16, the Examiner's specific complaint was that the language "evaluating an incumbent-algorithm score indicative of a performance of an incumbent algorithm" was not described in the specification. But this specific language is missing from claims 14 and 29. Hence, Appellant has no way of knowing why claims 14 and 29 are believed to fail to meet the written description requirement. It is not possible for Appellant to respond meaningfully to a section 112 rejection that is so lacking in detail.

Since the Examiner has failed to provide even a rudimentary basis for rejecting these claims under section 112, Appellant submits that the rejection is improper.

Claim 15: "generating data indicative of a performance attribute"

Claim 15 recites the limitation of "generating data indicative of a performance attribute of a competing algorithm when said competing algorithm operates on a data-stream characterized by said meta-data."

The Examiner appears to suggest that one of ordinary skill would have difficulty understanding "performance attribute."

The specification describes performance attributes as follows:

"Generally, the performance attribute measures, directly or indirectly, the latency that results from application of the incumbent algorithm to the input data-stream 22.

The choice of a performance attribute depends in part on the task to be performed. For example, if the task is to manage a cache memory, a suitable performance attribute might be a hit ratio that indicates the probability that data sought is already in the cache memory. Other performance attributes might include

²⁵ Final Office Action, page 8.

response time, bandwidth, and throughput.”²⁶

In the Final Office Action, the Examiner acknowledges the various examples of performance attributes in the specification, but then complains that they are all cited as examples.²⁷ In effect, the Examiner is suggesting that one cannot meet the written description requirement by providing several examples of what is meant by a claim term.

The Examiner has not presented any plausible evidence for why one of ordinary skill in the art would not recognize that Appellant was in possession of the invention recited in the claim.

The Examiner also complains that one of ordinary skill in the art would not know which of the disclosed performance attributes is included in the claimed subject matter.

However, the pending rejection is one under 35 USC 112 first paragraph. The question of whether the claim particularly points out and distinctly claims the subject matter of the invention, so that one would know which performance attributes are included in the claimed subject matter, is associated with 35 USC 112 second paragraph.

Moreover, since the claim does not, by its terms, exclude any performance attribute, it quite clearly includes at the very least, all disclosed performance attributes, both singly and in combination.

Claim 17: “providing data indicative of...”

The Examiner states that claim 17 fails to meet the written description requirement because the limitation

“providing data indicative of whether said competing algorithm is preferable,”
is not supported by the specification.

²⁶ Specification, page 6, lines 17-23.

²⁷ Final Office Action, page 9.

However, the absence of support for the foregoing limitation is irrelevant because claim 17 does not even include that limitation. The written description requirement does not apply to unclaimed subject matter.

The Examiner has the burden of providing a reason why one of ordinary skill in the art would fail to regard the Appellant as being in possession of the invention *as claimed* in claim 17. Thus far, the Examiner has not done so. Accordingly, the section 112 rejection of claim 17 is improper.

Claim 20: “evaluating a ratio...”

As a threshold matter, claim 20 is an originally filed claim, and as such is available for providing its own written description.

Claim 20 recites the limitation of

“evaluating a ratio indicative of an extent to which said competing-algorithm score exceeds said incumbent algorithm score during said selected interval.”

This limitation is described in the passage:

“a suitable performance attribute might be a hit ratio that indicates the probability that data sought is already in the cache memory.”²⁸

Appellant points out that “it is not required that the application describe the claim limitations in greater detail than the invention warrants. Then description must be sufficiently clear that persons of skill in the art will recognize that the Appellant made the invention having those limitations.”²⁹

In this case, one of ordinary skill in the art would clearly understand that one ratio that has the appropriate properties recited in the claim is the hit ratio.

The Examiner complains that the hit ratio is merely an example of a performance attribute. However, there is no law that suggests a prohibition against examples. It is permissible to recite, for example, a genus and to provide examples thereof.

²⁸ *Specification*, page 6, lines 20-22.

²⁹ *Martin v. Mayer*, 823 F.2d 500 (Fed. Cir. 1987).

The Examiner also complains that one of ordinary skill in the art would not know whether this feature is included in the claimed subject matter.

However, the pending rejection is one under 35 USC 112 first paragraph. The question of whether the claim particularly points out and distinctly claims the subject matter, so that one would know whether a feature is included in the claimed subject matter, is associated with 35 USC 112 second paragraph.

SECTION 101 REJECTION OF CLAIM 1

The present invention is directed to determining whether or not it would be advantageous to “change horses in mid-stream.”

In a data-storage system, there often exists more than one way to perform a data-storage task. As circumstances change, the best way to carry out a particular task may change. The invention is directed toward determining whether or not circumstances have changed enough so that it would be advantageous to change the method used to perform a task.

Claim 1 recites a method for obtaining information that is useful for dynamically choosing the best method for performing a task. The result of executing claim 1 is a pair of scores. One score, the “incumbent-algorithm score” describes how adept a particular algorithm (i.e. the *incumbent* algorithm) is at performing a task, and the other, the “competing-algorithm score” describes how adept another algorithm (i.e. the “competing algorithm”) would have been, had it been executing in place of the incumbent algorithm.

Claim 1 thus recites a method of producing certain numerical results that are ultimately used to decide whether to replace an incumbent algorithm with a competing algorithm.

In finally rejecting the claim, the Examiner states

“besides the performance of the claimed method by a human being, what other means could this method produce a final result that is useful, concrete and tangible? And if this method is not computer-implemented (i.e. steps performed by the execution of appropriate computer instruction code) then the claimed method recites abstract and non-statutory subject matter not directed to a practical application which produces a useful concrete and tangible result”

As best understood, from the foregoing remarks, the Examiner is suggesting that if a method can be carried out by a human being, it does not produce a useful, concrete and tangible result. However, nowhere does the law state that if a human being can carry out a method, then that method cannot yield a useful, concrete, and tangible result. There is no suggestion in the law that computers have a monopoly on carrying out useful processes that yield a tangible result.

On the contrary, according to *Alco Standard*,

"[t]he inclusion in a patent of a process that may be performed by a person, but is also capable of being performed by a machine, is not fatal to patentability."³⁰

This is consistent with the Patent Office's longstanding practice of granting method claims; a practice that pre-dates the advent of computer-implemented methods.

It is quite clear that a human being's ability to carry out a claimed method does not disqualify that method from patentability under section 101.

The Examiner also appears to regard claim 1 as failing to recite a useful, concrete and tangible result. However, the result of claim 1 is no different in principle from that at issue in *State Street*.³¹

In *State Street*, the Court stated that the claimed method yielded

"a final share price momentarily fixed for recording and reporting purposes and relied upon by regulatory authorities in subsequent trades."

Consistent with *State Street*, claim 1 is directed at measuring a value that is later used for a practical purpose. It is useful to compare the two cases:

- In *State Street*, the share price measures how well a business carries out the ongoing task of making a profit. In the present claim, the two scores measure how well two algorithms carry out an ongoing task.
- In *State Street*, the share price is relied upon by "regulatory authorities" in connection with "subsequent trades." In the present claim, the two scores are

³⁰ *Alco Standard Corp. v. Tennessee Valley Authority*, 808 F.2d 1490 (Fed. Cir. 1986), cert. dismissed, 483 US 1052 (1987).

³¹ *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998).

relied upon by a data storage system in connection with deciding whether or not to change the algorithm being used to carry out the ongoing task.

Both the *State Street* share price and claim 1's scores are thus used to make decisions that have tangible consequences. Decisions based on *State Street*'s measurement of share value can result in tangible profits. Similarly, decisions based on claim 1's measurements of algorithm performance can result in more efficient operation of computer hardware.

Moreover, claim 1 recites the step of providing the two scores to an output device. Thus, claim 1 results in far more than the manipulation of abstract ideas without a practical application.

Appellant recognizes that the claim at issue in *State Street* was an apparatus claim, and not a method claim. But for purposes of section 101 analysis, there is no significant distinction between method and apparatus claims.³²

Section 101 rejection of claim 14

Claim 14 recites providing data indicative of a comparison between an incumbent algorithm and a competing algorithm.

Like *State Street*, the data being provided in this last step of the claim is ultimately relied upon to decide whether or not to change the algorithm being used to carry out an ongoing task. Hence, the claim as a whole recites steps that lead to a useful, concrete, and tangible result.

Section 101 rejection of claim 10

With regard to claim 10, Appellant recognizes that the step of statistically characterizing a usage pattern is mere manipulation of numbers without practical application.

However, claim 10's second step recites using the resulting statistical characterization to simulate performance of a competing algorithm were that algorithm to execute on the data storage system in place of the incumbent algorithm. This second step provides a new way to measure a quantity that would not otherwise be measured, namely how well an algorithm that was not, in fact, executing, would have performed had it been executing.

³² *AT&T v. Excel Communications*, 172 F.3d 1352, 1357 (Fed. Cir. 1999).

Appellant : Eitan Bachmat et al.
Serial No. : 10/083,670
Filed : February 26, 2002
Page : 21 of 30


Attorney's Docket No.: 07072-152001 / EMC-02-023

Simulation is not per se devoid of practical application. Simulation is used in a variety of applications to see what particular acts might do without having to actually carry out those procedures. That the procedure to be simulated in this case is an algorithm, rather than, for example, an airplane, does not rob simulation of its practical value.

Please apply the required brief fee of \$500 and any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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Faustino A. Lichauco
Reg. No. 41,942

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110
Telephone: (617) 542-5070
Facsimile: (617) 542-8906
21407529.doc

Appendix of Claims

1. In a data-storage system, a method for providing data indicative of the performance of a competing algorithm and an incumbent algorithm, said method comprising:

evaluating an incumbent-algorithm score indicative of a performance of an incumbent algorithm;

simulating performance of a competing algorithm executing in place of said incumbent algorithm;

on the basis of said simulation, evaluating a competing-algorithm score predictive of a corresponding performance of said competing algorithm; and

providing said competing-algorithm score and said incumbent-algorithm score to an output device.
2. The method of claim 1, further comprising providing data indicative of a performance difference between said competing algorithm and said incumbent algorithm.
3. The method of claim 2, wherein providing data comprises monitoring said incumbent-algorithm score and said competing-algorithm score during a selected interval.
4. The method of claim 3, wherein providing data further comprises displaying data indicative of a performance of said incumbent algorithm and said competing algorithm during said selected interval.
5. The method of claim 4, wherein displaying data comprises evaluating a ratio indicative of an extent to which said competing-algorithm score exceeds said incumbent algorithm score during said selected interval.
6. The method of claim 1, wherein simulating performance comprises:

obtaining meta-data characterizing an input-data stream provided to said incumbent algorithm; and

simulating performance of said competing algorithm were it to operate on an input-data stream characterized by said meta-data.

7. The method of claim 6 wherein obtaining meta-data comprises maintaining statistics descriptive of said input data-stream during a selected interval.
8. The method of claim 1, wherein evaluating a competing-algorithm score comprises incorporating a penalty into said competing-algorithm score.
9. The method of claim 8, further comprising selecting said penalty to be indicative of a cost associated with replacing said incumbent algorithm with said competing algorithm.
10. A method for providing data indicative of a performance of a competing algorithm and an incumbent algorithm in a data-storage system, said method comprising:

statistically characterizing a usage pattern of said data-storage system; and

on the basis of said statistical characterization, simulating a performance of said competing algorithm were it to execute on said data-storage system in place of said incumbent algorithm.
11. The method of claim 10, further comprising:

evaluating actual performance of said incumbent algorithm in response to said usage pattern;

simulating said performance of said competing algorithm in response to said usage pattern; and

communicating, to an output device, data indicative of a comparison between said actual performance of said incumbent algorithm and said simulated performance of said competing algorithm.

12. The method of claim 10, wherein statistically characterizing a usage pattern of said data-storage system comprises generating meta-data that characterizes an input data-stream to said data-storage system.
13. The method of claim 11, further comprising incorporating a cost of replacement into a performance selected from the group consisting of:
 - (1) said actual performance of said incumbent algorithm, and
 - (2) said simulated performance of said competing algorithm.
14. A method for comparing performances of a plurality of algorithms in performing a task, said method comprising:
 - simulating execution of a competing algorithm operating on an input stream;
 - evaluating, on the basis of said simulation, a competing-algorithm performance of said competing algorithm;
 - evaluating an incumbent-algorithm performance of an incumbent-algorithm operating on said input stream; and
 - providing data indicative of a comparison between said incumbent-algorithm performance and said competing-algorithm performance.
15. A data-storage system comprising
 - a processor,
 - and computer-readable media having software encoded thereon, said software having instructions for causing the processor to execute
 - a data-condenser configured to receive a data-stream, said data-condenser generating meta-data characterizing said data stream;

a competing-algorithm simulator in communication with said data-condenser, said competing algorithm simulator generating data indicative of a performance attribute of a competing algorithm when said competing algorithm operates on a data-stream characterized by said meta-data; and

a tournament manager configured to provide output data indicative of a comparison between a performance attribute of said competing algorithm and a corresponding performance attribute of an incumbent algorithm.

16. A computer-readable medium having encoded thereon software for providing data indicative of the performance of a competing algorithm and an incumbent algorithm, said software comprising instructions for:

evaluating an incumbent-algorithm score indicative of a performance of an incumbent algorithm;

simulating performance of a competing algorithm executing in place of said incumbent algorithm;

on the basis of said simulation, evaluating a competing-algorithm score predictive of a corresponding performance of said competing algorithm; and

providing said competing-algorithm score and said incumbent-algorithm score to an output device.

17. The computer-readable medium of claim 16, wherein said software further comprises instructions for providing data indicative of a performance difference between said competing algorithm and said incumbent algorithm.

18. The computer-readable medium of claim 17, wherein said instructions for providing data comprise instructions for monitoring said incumbent-algorithm score and said competing-algorithm during over a selected interval.

19. The computer-readable medium of claim 18, wherein said instructions for providing data further comprise instructions for displaying data indicative of a performance of said incumbent algorithm and said competing algorithm during said selected interval.
20. The computer-readable medium of claim 19, wherein said instructions for displaying data comprise instructions for evaluating a ratio indicative of an extent to which said competing-algorithm score exceeds said incumbent algorithm score during said selected interval.
21. The computer-readable medium of claim 16, wherein said instructions for simulating performance comprise instructions for:

obtaining meta-data characterizing an input-data stream provided to said incumbent algorithm; and

wherein simulating performance of a competing algorithm comprises simulating performance of said competing algorithm were it to operate on an input-data stream characterized by said meta-data.
22. The computer-readable medium of claim 21 wherein said instructions for obtaining meta-data comprise instructions for maintaining statistics descriptive of said input data-stream during a selected interval.
23. The computer-readable medium of claim 16, wherein said instructions for evaluating a competing-algorithm score comprise instructions for incorporating a penalty into said competing-algorithm score.
24. The computer-readable medium of claim 23, wherein said software further comprises instructions for selecting said penalty to be indicative of a cost associated with replacing said incumbent algorithm with said competing algorithm.

25. A computer-readable medium having encoded thereon software for providing data indicative of a performance of a competing algorithm and an incumbent algorithm in a data-storage system, said software comprising instructions for:
- statistically characterizing a usage pattern of said data-storage system; and
- on the basis of said statistical characterization, simulating a performance of said competing algorithm were it to execute on said data-storage system in place of said incumbent algorithm.
26. The computer-readable medium of claim 25, wherein said software further comprises instructions for:
- evaluating actual performance of said incumbent algorithm in response to said usage pattern;
- simulating said performance of said competing algorithm in response to said usage pattern; and
- communicating, to an output device, data indicative of a comparison between said actual performance of said incumbent algorithm and said simulated performance of said competing algorithm.
27. The computer-readable medium of claim 25, wherein said instructions for statistically characterizing a usage pattern of said data-storage system comprise instructions for generating meta-data that characterizes an input data-stream to said data-storage system.
28. The computer-readable medium of claim 26, wherein said software further comprises instructions for incorporating a cost of replacement into a performance selected from said actual performance of said incumbent algorithm and said simulated performance of said competing algorithm.

29. A computer-readable medium having encoded thereon software for comparing performances of a plurality of algorithms in performing a task, said software comprising instructions for:
- simulating execution of a competing algorithm operating on said input stream;
 - evaluating, on the basis of said simulation, a competing-algorithm performance of said competing algorithm;
 - evaluating an incumbent-algorithm performance of an incumbent-algorithm operating on said input stream;
 - providing data indicative of a comparison between said incumbent algorithm and said competing algorithm.

Appellant : Eitan Bachmat et al.
Serial No. : 10/083,670
Filed : February 26, 2002
Page : 29 of 30

Attorney's Docket No.: 07072-152001 / EMC-02-023

Evidence Appendix

None

Appellant : Eitan Bachmat et al.
Serial No. : 10/083,670
Filed : February 26, 2002
Page : 30 of 30

Attorney's Docket No.: 07072-152001 / EMC-02-023

Related Proceedings Appendix

None